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**DESCRIPTION OF AN UNKNOWN PUPA OF THE GENUS *KALUGINIA* MAKARCHENKO, 1987 (DIPTERA: CHIRONOMIDAE, DIAMESINAE) FROM THE AMUR RIVER BASIN**

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**Summary.** The first description of a pupa of the genus *Kaluginia* Makarchenko is provided. Pupa of this genus is characterized by almost all diagnostic features of the genus *Boreoheptagyia* Brundin, with the exception of the structure of the frontal ocular field of the head, where there are long frontal setae on the prefrons are present. All known *Boreoheptagyia* species without frontal setae on the head.

**Key words:** Diptera, Chironomidae, Diamesinae, *Kaluginia*, pupa, morphology, Russian Far East.

**Е. А. Мака́рченко, Н. М. Яворская, Ю. И. Яковлева. Описание ранее неизвестной куколки рода *Kaluginia* Makarchenko, 1987 (Diptera: Chironomidae, Diamesinae) из бассейна р. Амур // Дальневосточный энтомолог. 2020. N 407. С. 21-24.**

**Резюме.** По материалу из бассейна р. Амур описана куколка рода *Kaluginia* Makarchenko. Большинство диагностических признаков этого рода сходно с таковыми рода *Boreoheptagyia* Brundin, за исключением вооружения фронтального поля головы, где на префронсе имеются две длинные щетинки. Все известные виды *Boreoheptagyia* без фронтальных щетинок на голове.

**INTRODUCTION**

The genus *Kaluginia* Makarchenko, 1987 was established with the description of *K. lebetiformis* Makarchenko, 1987 by adult male from the south part of Sakhalin Island (Makarchenko, 1987). Later this species was redescribed by adult male from South Korea and the Amur River basin with using of both morphological and DNA barcoding data, and as a result,

two subspecies were allocated – *K. lebetiformis lebetiformis* Makarchenko for specimens from the Russian Far East and *K. lebetiformis koreana* Makarchenko for specimens from South Korea (Makarchenko *et al.*, 2018, 2020). The immature stages for these subspecies and the genus *Kaluginia* were not known. After the last publication on taxonomy of the genus *Kaluginia* (Makarchenko *et al.*, 2020), N.M. Yavorskaya found in the bottom samples from Pihtsa River of the Amur River basin mature pupa (male) of *K. lebetiformis lebetiformis*, after which it became possible for the first time to make a description of the pupa for the genus *Kaluginia*. We provide this description below.

## MATERIAL AND METHODS

The material was preserved in 70% ethanol, and slide-mounted in polyvinyl lactophenol following the recommendations of Moubayed and Langton (2019). The terminology follows Sæther (1980).

Material is deposited in the Laboratory of Freshwater Hydrobiology of the Federal Scientific Center of the East Asia Terrestrial Biodiversity (Vladivostok).

## DESCRIPTION

### *Kaluginia lebetiformis lebetiformis* Makarchenko, 1987

Figs 1–6

*Kaluginia lebetiformis* Makarchenko, 1987: 786, 2006: 266; Oliver, 1989: 134; Ashe & Connor, 2009: 291; Makarchenko *et al.*, 2018: 28, fig. 4 (partim).

*Kaluginia lebetiformis lebetiformis*: Makarchenko *et al.*, 2020: 21, fig. 1–3, 6–8.

**MATERIAL EXAMINED.** **Russia:** Khabarovsk Territory, Nanaisky District, Anyuisky National Park, Pihtsa River (tributary of Gassi Lake), Amur River basin, 48.47.804° N, 136.47.027° E, 21.V 2019, 1 mature pupa of male, leg. N. Yavorskaya.

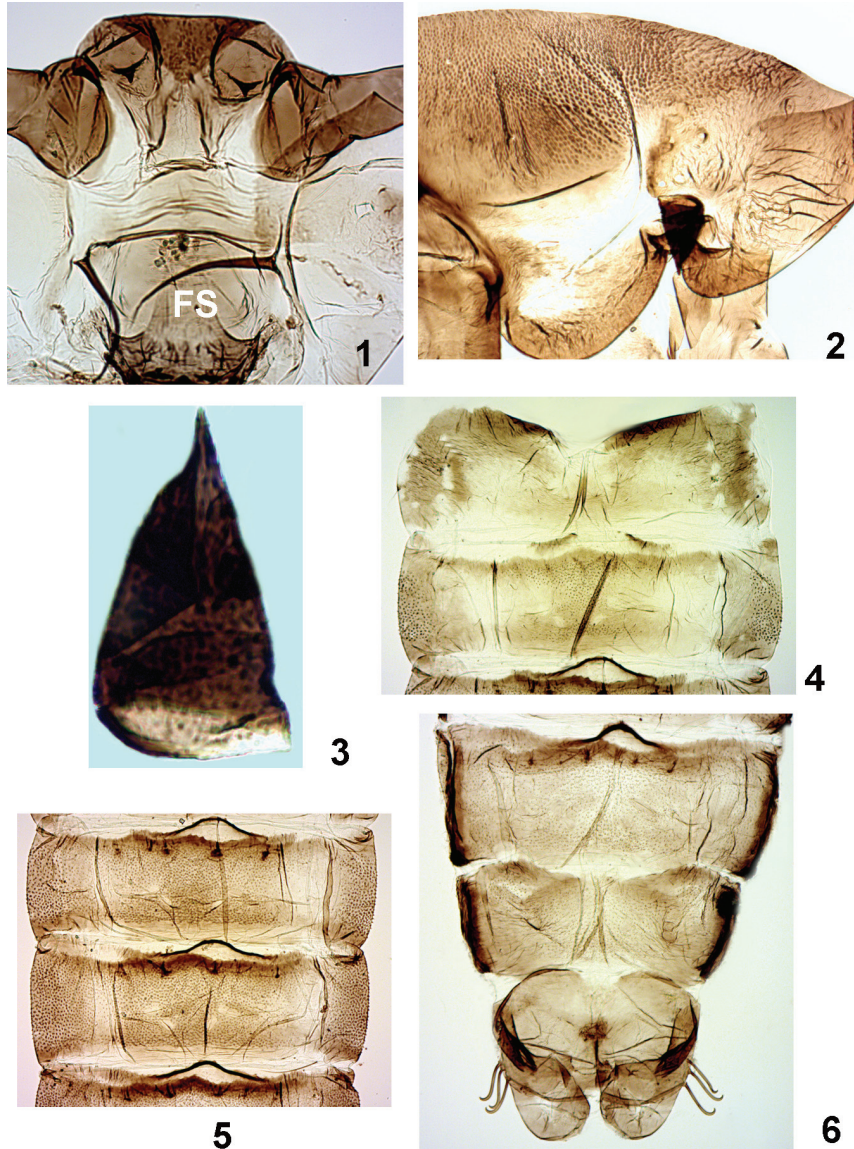
**DESCRIPTION.** *Pupa* (n=1). Total length 3.7 mm. Exuviae with brown cephalothorax and brownish abdomen.

**Cephalothorax.** Frontal apotome without warts, with small conical cephalic tubercles, 16 µm long. Two dark brown and long (152–164 µm) frontal setae are present on prefrons (Fig. 1). Thorax dorsally strongly granulated in the anterior two-thirds, wrinkled in the posterior third (Fig. 2). Thoracic horn strongly sclerotized, from dark brown to black, triangular, 124 µm long and 64–68 µm width in basal part, covered with hairlike setae, 4–6 µm long (Fig. 3). Three precorneals, 28–76 µm long, 2 median and 2 lateral anteprenotals, 48–64 µm long, 2 dorsocentrals are present.

**Abdomen.** Tergite I and tergite IX without shagreen. Tergites II–VIII with median and lateral shagreen of spinules, but shagreen on tergite II less intense (Figs. 4–5). Sternites without shagreen. Tergites and sternites without posterior spines. Apophyses normal developed (Fig. 5). Tergites I–VII with 5 dorsal setae, tergite VIII with 1 dorsal seta. Segment I with 2 pairs, segments II–VIII with 4 pairs of hairlike lateral setae, 32–98 µm long. Anal lobe broad, with 3 strong, apically hooked anal macrosetae, 80–88 µm long; also with 3 dorsomedial and 1 ventromedial setae, 44–52 µm long. Male genital sac broad, strongly extended beyond anal lobe and apex curved dorsally (Fig. 6).

**REMARKS.** Pupa of *K. lebetiformis lebetiformis* is a typical for representatives of the tribe Boreoheptagyini, for which the pupa was previously known only to the genus *Boreoheptagyia* Brundin. Most of the features of *K. lebetiformis lebetiformis*, and the genus *Kaluginia*,

are very similar or the same to those of *Boreoheptagyia* (Oliver, 1986). We found only one significant diagnostic feature that distinguishes these two genera. Pupa of *Kaluginia* with 2 long dark brown cephalic frontal setae on the prefrons (Fig. 1). All known *Boreoheptagyia* species without frontal setae on the head (Oliver, 1986).



Figs 1–6. Pupa of *Kaluginia lebetiformis lebetiformis* Makarchenko. 1 – frontal apotome and ocular field; 2 – anterior part of thorax, lateral view; 3 – thoracic horn; 4 – tergites I–II; 5 – tergites II–IV; 6 – tergites VII–VIII and anal segment. FS – frontal setae.

ECOLOGY. Pupa was collected on pebble gravel ground, partially covered with algae at a water temperature of 7°C and with high speed water.

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